Pilkington **Activ Suncool**™ and Pilkington **Activ Optitherm**™ SN

Handling and Processing Guidelines for Processors

PILKINGTON

In general, Pilkington **Activ Suncool**™ and Pilkington **Activ Optitherm**™ SN are processed as you would a normal coated glass; however, as these products have a unique dual coating, one of the coated surfaces also faces down. Therefore, we have produced the following instructions to help you.

1 General Product Description

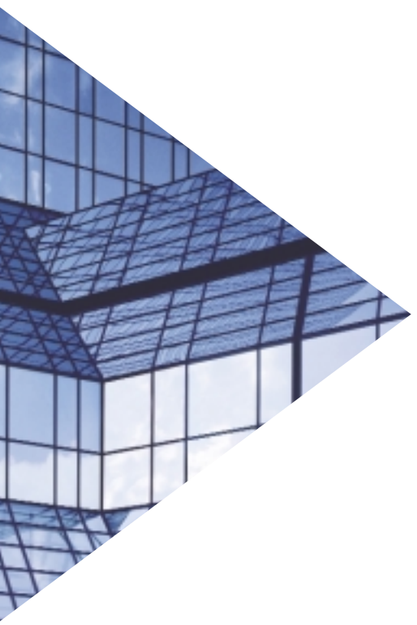
Pilkington **Activ Suncool**™ and Pilkington **Activ Optitherm**™ SN are a range of dual coated products incorporating the Pilkington **Activ**™ self-cleaning coating and either a Pilkington **Suncool**™ solar control coating or a Pilkington **Optitherm**™ SN low-emissivity coating on a single sheet of glass.

Pilkington **Activ**™ is a durable, coated, neutral-coloured, self-cleaning glass that requires less frequent cleaning and provides clearer vision during and after rainfall compared to ordinary float glass. It has good scratch resistance and durability and in most circumstances can be treated the same as ordinary float glass.

It is produced on-line during the float manufacturing process. Pilkington **Suncool**™ and **Optitherm**™ SN coatings are deposited in an off-line vacuum process onto the uncoated face of Pilkington **Activ**™.

Pilkington **Activ Suncool**™ combines excellent solar control with a range of optical performances to improve the aesthetic appearance, energy efficiency and occupier comfort of a building, as well as self-cleaning properties.

Pilkington **Activ Optitherm**™ SN is a neutral coloured low emissivity glass that provides high thermal insulation to glazed windows, as well as self-cleaning properties. It should be glazed with the Pilkington **Optitherm**™ SN coating on surface 2 (counting from the outside of the building).



As the Pilkington **Suncool**™ and **Optitherm**™ SN coatings are soft, it is possible to damage the coating during processing. The coated glass must be positioned so that the Pilkington **Suncool**™ and **Optitherm**™ SN coatings are away from sources of abrasion during all stages of processing, except edge stripping.

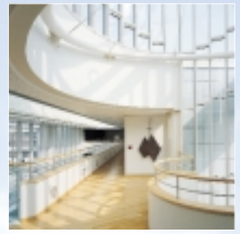
The Pilkington **Activ**™ coating is more robust in nature and the product is classified as a Class A coated glass in accordance with EN 1096. As such it exhibits good scratch resistance and durability in normal circumstances. Pilkington **Activ Suncool**™ and **Activ Optitherm**™ SN must be processed with the Pilkington **Activ**™ coating face down during processing. However, it should be borne in mind that the Pilkington **Activ**™ coating can be damaged and should be protected from sources of scratching and abrasion particularly during the cutting and break-out steps.

The Pilkington **Activ Suncool**™ and **Activ Optitherm**™ SN products shall always be incorporated into an insulating glass unit. The products should be glazed so that the Pilkington **Activ**™ coating is positioned on surface 1 (i.e. the outside of the building) and the Pilkington **Suncool**™ or **Optitherm**™ SN coating positioned on surface 2 (i.e. the inner face of the outer pane). Only in this configuration will the maximum benefits from the product's self-cleaning and solar control or thermal insulation properties be gained. To maintain these properties it is also important that handling and processing is carried out strictly in accordance with good practices as described later.

2 Product Range

Float

The Pilkington **Activ Suncool**™ and **Activ Optitherm**™ SN products in annealed form are available in jumbo and split sizes in thicknesses from 4mm to 10mm. Jumbo and split sizes are only available in batches of 2.5 tonnes.



Laminated

The Pilkington **Activ Optilam Suncool**™ and **Activ Optilam Therm**™ products are available in jumbo and split sizes in nominal thicknesses from 6mm up to 12mm. Jumbo and split sizes are only available in batches of 2.5 tonnes.

Toughened

In addition, toughened cut size sheets of the Pilkington **Activ Suncool**™ and **Activ Optitherm**™ SN products can be ordered.

Pilkington **Activ**™
self-cleaning glass

3 Delivery and Storage

Pilkington **Activ Suncool**™ and **Activ Optitherm**™ SN are delivered on stillages in pack quantities and a manner consistent with that of clear glass of similar thickness and size. It is always delivered with the off-line deposited Pilkington **Suncool**™ or **Optitherm**™ SN coated surface to the inside of the pack. Please note that the innermost glass of each pack will be a cover plate, usually 4mm Pilkington **Optifloat**™ (not coated).

This is to avoid damaging the coating by pack separators. For coated laminated glass, the last sheet in the pack is uncoated Pilkington **Optilam**™ of nominal thickness 6mm. An identification label on the pack gives detailed information.

The annealed products are protected by PMMA powder (lucite) interleavant between plates. This absorbs any moisture that may develop in the pack during transportation. The toughened products are protected by a paper interleavant between plates.

As with Pilkington **Optifloat**™, Pilkington **Activ Suncool**™and **Activ Optitherm**™ SN shall be unloaded and stored in dry and well-ventilated conditions, stacked upright and fully supported following good practice.
The glass should be stood on edge strips of wood, felt or other relatively soft material. Please remember that the coated surfaces can be damaged so care is necessary when unloading glass packs to ensure that plates in the pack do not move.

It is recommended that, once opened, the coated glass pack shall be used as soon as possible. As local environmental conditions (particularly humidity levels) can affect the allowed storage time, individual customers should determine what is an acceptable storage period. As a general guide, it is recommended that packs are stored so that a relative humidity of 70% is not exceeded, nor the room temperature allowed to fall below 15ºC.

Before using a pack during cold weather, time should be allowed for the pack to acclimatise to the ambient temperature.

This will help avoid condensation and potential damage to the coated sheets. If condensation does appear then the affected sheets must be washed and dried immediately. Failure to do this can cause the Pilkington **Suncool**™ or Pilkington **Optitherm**™ SN coating to react, which can detract from its finished quality.

The recommended storage times for these products is the same as the storage times recommended for standard Pilkington **Suncool**™ and Pilkington **Optitherm**™ SN.

4 Coating Detection

The off-line deposited Pilkington **Suncool**™ or **Optitherm**™ SN coating can be differentiated from the Pilkington **Activ**™ coating by means of a standard conductivity meter. The Pilkington **Suncool**™ or **Optitherm**™ SN coating is conductive and will produce a reading of <20 ohms/square. The Pilkington **Activ**™ coating is non-conductive and will produce an off-scale or infinite reading. (Note: detectors produced specifically for Pilkington **Activ**™ should not be used for Pilkington **Activ Suncool**™ or **Activ Optitherm**™ SN, as they will give an inaccurate reading when used with dual coatings).

5 Handling

As the Pilkington **Suncool**™ or **Optitherm**™ SN coating is soft some precautions are necessary when handling the products. Wherever possible individual plates should be moved using automatic equipment fitted with suction cups or equivalent in contact with the Pilkington **Activ**™ side only. Glass shall never be moved by any mechanical method that involves contact with the Pilkington **Suncool**™ or **Optitherm**™ SN surface.

Suction cups used on the Pilkington **Activ**™ coated surface must be clean, dry, in good condition and shall not slide on the surface. More frequent sucker inspection and maintenance may be required to maintain good condition. The use of ‘hair net’ type sucker covers is also recommended (although these should comply with local Health & Safety guidelines). Care should also be taken to ensure that any sucker release compressed air supply is adequately filtered to remove traces of oil.

When manual handling is required suitable glass-handling gloves should be worn to prevent leaving fingerprints and provide hand protection. Wherever possible, the sheets should be handled at the edges where the Pilkington **Suncool**™or **Optitherm**™ SN coating has been or will be edge stripped. When unloading or transporting individual cut size sheets or off-cuts, cork pads or paper interleaving should be used to prevent damage to the coating (although this isn’t necessary between cutting and edge working).

If any marks are present on either the Pilkington **Suncool**™ or the **Optitherm**™ SN coating after handling, no attempt should be made to remove them as damage may occur.

Pilkington **Activ**™
self-cleaning glass

6 Labelling & Product Marking

Wax crayons or inks of any kind shall not be used to mark either of the coated surfaces. Adhesive labels can be applied to the Pilkington **Activ**™ surface provided a suitable low-tack adhesive is used. Alternatively, apply identification marks to the edge-deleted region of the Pilkington **Suncool**™ or **Optitherm**™ SN surface.

7 Edge Stripping

Edge stripping of the Pilkington **Suncool**™ HP or **Optitherm**™ SN surface is required to ensure a good edge seal is achieved during insulating glass unit fabrication. The edge stripping process can be undertaken on-line or off-line. The off-line process is normally carried out using a 130 grade dry wheel, pressure of 21-26N, and edge stripping width of 10mm. However, the width over which the coating is stripped at the edge depends on the insulating glass unit design used.

The Pilkington **Activ**™ coating is always glazed as surface 1 and does not require edge stripping.

8 Cutting

Pilkington **Activ Suncool**™ and **Activ Optitherm**™ SN must be loaded onto the cutting table with the Pilkington **Suncool**™ or **Optitherm**™ SN coated surface uppermost, and shall be cut in this position only. As the Pilkington **Activ**™ coated surface will be face down during transport, cutting and break-out stages, extra care must be taken to ensure that potential sources of scratching are removed during these stages.

Prior to cutting Pilkington **Activ Suncool**™ or **Activ Optitherm**™ SN, the cutting and break-out tables should be cleaned to ensure they are free of glass shards which might damage the Pilkington **Activ**™ surface. It is recommended that a vacuum cleaner is used although thorough brushing of the table(s) may be adequate. The tables should also be monitored during cutting to ensure that glass shards do not build up as the plates are cut. Transport rollers and belts should also be well maintained and free from sources of metallic abrasion.

As the Pilkington **Suncool**™ or **Optitherm**™ SN coating will be face up, automatic cutting is the preferred option, as is edge deletion at cutting. If manual cutting is used then great care must be taken with straight edges, metal tape measures, cutting bars or cutting sticks when placing them on to the coated surface, as some marking or scratching will inevitably occur. During break-out, top surface positioning or snapping wheels should not come into contact with the coating.

A dry wheel cut is preferred for scoring the glass prior to break-out. However, a minimal amount of water-soluble cutting lubricant with a fast evaporation rate may also be used. Cutting oil should also be employed if excess splintering is observed during scoring. This will reduce glass shard accumulation on the cutting table.

Operators should wear appropriate glass-handling gloves and aprons to protect the coated surface from contact with belt buckles or metal studs and care should be taken with watch straps or other jewellery. Gloves should be clean and checked to ensure that they do not leave prints on the coated surface.

Wooden or plastic break-out bars are the preferred option. If metal bars are employed the glass should be carefully examined after break-out for signs of metallic abrasion.

When unloading or transporting cut glass the original interleavant powder will continue to provide protection. If there is some loss of interleavant powder, cork pads or paper interleaving should be used. This is also the case when transporting toughened sheets for which powder interleaving may not have originally been used.

9 Washing

Pilkington **Activ Suncool**™ and **Activ Optitherm**™ SN should be washed using a vertical or horizontal multi-stage automatic washer using hot (40-55°C) de-mineralised water and soft brush rollers with a bristle diameter of no greater than 0.15mm. The glass shall pass through the washer with the Pilkington **Suncool**™ or **Optitherm**™ SN coating uppermost and away from the transport rollers. The washing machine should be designed so that if the conveyor stops with glass under the brushes then those brushes stop rotating, otherwise coating damage will occur.

If a vertical washing machine is used, all of the requirements described above also apply.

In addition, entry and exit brushes & flaps and internal drive or guide rollers may need modifying or re-setting.

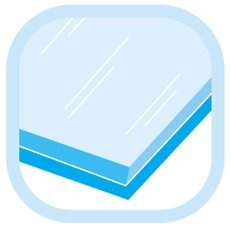
Water quality is critical for washing of all coated products. There shall be no additives (detergents) in the water. It is essential that the water quality indicated is achieved at all process stages and equipment is maintained to manufacturer recommendations. It is recommended that the pre- and initial rinse stages should be with deionised water with a specific conductivity of no greater than 30µS/cm. The final rinse should be with deionised water with a specific conductivity not exceeding 10µS/cm. However, the glass processor should determine an acceptable level for his specific process.

After washing the glass should be air dried and immediately processed into insulating glass units. If the glass needs to be transported between washing and unit fabrication then it should be appropriately racked and separated with cork pads. If marks are present on the Pilkington **Suncool**™ or **Optitherm**™ SN coated surfaces after washing, no attempt should be made to remove them as coating damage will occur.

Irrespective of measured water quality, it is important that all washers are subjected to a regular programme of routine maintenance in accordance with manufacturer's recommendations. This should include regular examination and maintenance of the transport system to remove potential sources of damage to the Pilkington **Activ**™ coating.

Pilkington **Activ**™

self-cleaning glass



10 Insulating Glass Units

During fabrication of insulating glass units the Pilkington **Activ**™ coating should be face down against the transport mechanism. Again, great care should be taken to ensure that the unit fabrication line is in good clean working order to prevent damage to the Pilkington **Activ**™ surface. Transport rollers should be examined for signs of ageing and excessive hardening and to ensure no metallic contact is made against the coated surface. The press region of the line should also be inspected regularly and any areas of glass contact cleaned thoroughly.

During assembly the spacer bar is placed on the first glass as normal. This first glass will have the Pilkington **Activ**™ coating facing into the rollers so that it is on the outside of the finished IGU. The second glass is positioned on the spacer bar and pressed. The IGU is completed by filling the edge with sealant. As the Pilkington **Suncool**™ or **Optitherm**™ SN coating has been edge-deleted most conventional sealants (including Hot Melt Butyls, Polysulphides, Urethanes and Two Part Silicones) can be used, as is the case for clear glass. Units can be gas filled as normal with no effect on the coating. Suitable sealants and drying agents should be used in accordance with the general recommendations for the particular gas used. When assembling the unit make sure contact with the Pilkington **Suncool**™ or **Optitherm**™ SN coated surface is kept to a minimum. Metallic contact should especially be avoided.

Units can be sealed using either automatic or manual sealant application. In both cases it is recommended that contact be made to the uncoated float pane of the unit. If this is not possible and contact must be made to the Pilkington **Activ**™ surface, then clean rubber contact suckers should be used. These should be inspected and cleaned regularly and the use of 'hair net' type sucker covers is recommended. Care should also be taken to ensure that any sucker release compressed air supply is adequately filtered to remove traces of oil.

In the event of sealant spillage onto the Pilkington **Activ**™ coated surface, a soft cloth soaked in methylated spirits or acetone should be used to remove the sealant while still wet (any Health and Safety requirements for using these chemicals should be followed). If sealant is allowed to dry the same method is recommended for its removal, but the task will be more difficult. Under no circumstances should razor blades, steel wool or abrasives be used.

Once the insulating glass unit is made, care should be taken to ensure the Pilkington **Activ**™ coated surface is protected from mechanical damage such as scratching, particularly from metallic sources.

It is recommended that any unit identification labels should be attached to the non-coated float pane. Should this not be possible then labels can be attached to the Pilkington **Activ**™ coating provided a suitable low tack adhesive is used. Wax crayons or inks should not be used on the coated surface.

11 Other Processing

Lead and/or colour overlay can generally be applied to the Pilkington **Activ**™ coated surface. However, Pilkington **Activ**™ will only retain its self-cleaning behaviour on the surface not covered by the lead and/or colour overlay. Care shall be taken that any tools used to apply the lead effect or overlay do not indelibly mark the coated surface. Lead should only be applied when the unit is fully fabricated.

It is the responsibility of the unit manufacturer to ensure that the lead and/or colour overlay, applied to the coated surface, is compatible with the Pilkington **Activ**™ coating and will not have any detrimental effect upon the surface, or any other component used in the manufacture of the unit.

Adding other components, such as Georgian Bars, inside the airspace of the insulating glass unit will not affect the Pilkington **Activ Suncool**™ or **Activ Optitherm**™ SN coatings. However, the appearance (colour) of these components may be changed slightly when viewed from outside, through the coating, compared with clear float glass.

12 Appearance

It is the responsibility of the processor to carefully inspect Pilkington **Activ Suncool**™ or **Activ Optitherm**™ SN, both before and after processing. Glass not rejected by the processor during inspection and prior to processing will be considered acceptable by Pilkington.

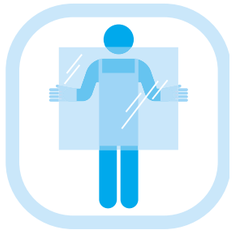
No attempt should be made to remove marks visible on the Pilkington **Suncool**™ or **Optitherm**™ SN coating, as coating damage will occur. Similarly attempts should not be made to remove scratch and/or abrasion marks on the Pilkington **Activ**™ coating.

However, some spot defects such as excess sealants or label adhesive residue can be removed from the Pilkington **Activ**™ surface. Mild, non-abrasive detergents (ones that do not contain solids in suspension) and water are recommended for such cleaning. Commercially available ammonia or alcohol-based window cleaners may also be used for spot cleaning. However, under no circumstances should steel wool, razor blades, abrasive cleaners, hydrofluoric acid, fluorine compounds or strong alkalis be used on the Pilkington **Activ**™ surface.

To wash/clean the Pilkington **Activ**™ coating apply the solution to the glass with a clean, soft cloth, sponge or pad and rinse thoroughly with clean water. Dry the glass by wiping with a soft lint-free cloth. Take care to ensure that no abrasive particles are trapped between the glass and the drying cloth or coating damage may occur.

Pilkington **Activ**™

self-cleaning glass



13 Transport and Storage of Insulating Glass Units

Care should be taken during curing, storage and transportation of insulating glass units to ensure adequate protection of the coated surface. Spacers or interleavant material should be used during storage and transport. The Pilkington **Activ**™ coated surface can also be covered with plastic wrap if additional protection is required. Care should be taken when choosing the protective film especially where the film may be adhered to the glass for long periods of time.

The edges of the glass should not be damaged during transport, storage and installation. If the IGUs awaiting glazing are manufactured with both panes toughened, they can be stored in direct sunlight. If one pane of the IGU is not toughened then they shall not be stored in direct sunlight as the solar heat absorbed may cause breakage in the annealed glass.

14 Repeat Orders, Colour Deviation

Production tolerances can cause slight colour deviations between different batches. These are minimal within a production run. In cases where glass for a project will have to be supplied over a longer period this has to be indicated to the manufacturer to ensure colour deviations are minimised.

15 Glazing

IGUs manufactured with Pilkington **Activ Suncool**™ or **Activ Optitherm**™ SN should be glazed in either a drained or drained & ventilated system, as in the normal recommended manner. Where possible a clean dry gasket glazing system or a system using non-setting oil-free glazing compounds should be used. The gasket should be of high quality that will minimise the leaching out of silicones from its surface.

Silicone sealants can exude oil or plasticisers containing silicones on curing, and long afterwards. These materials are very difficult to remove from the glass and Pilkington **Activ**™ coating. They are usually only visible when the glass/coating is wet, and even then they are only noticeable by the different water droplet formation when compared with non-contaminated glass. Where dry gasket glazing systems cannot be applied, materials based on MS polymers should be used. The use of silicone-containing lubricants on gaskets should be avoided. Dry gaskets or those lubricated with glycerine oil, talc or potato starch can be used instead. Nevertheless, the Pilkington **Activ**™ coating can be expected to break down some oils and lubricants over time. When glazing into frames do not use glazing tapes that contain oil (e.g. silicone and/or paraffin wax).

NB: Under no circumstances should linseed oil putty be used with Pilkington **Activ**™.

Whichever glazing method is used, advice should be sought form the manufacturer or supplier of the gasket or sealant.

Where the glass is adjacent to new lead flashings (e.g. conservatory installations), white carbonate run-off from the lead can stain the Pilkington **Activ**™ coating as it would ordinary float glass. This should be minimised by applying patination oil or **Leadshield**™ to the flashing when it is new.

As with all glass, care should be taken to ensure that alkaline leach-out from concrete, etc. does not occur. It is the fabricator's responsibility to ensure that the recommendations above are adhered to for each installation.

When Pilkington **Activ Suncool**™ or **Activ Optitherm**™ SN is glazed into a building, care must be taken during any further construction work to avoid staining or damage to the Pilkington **Activ**™ coating. The coating shall be protected from site contamination such as welding, rusty deposits, cement, plaster products or adhesives. After building work is completed the glass should be cleaned as soon as possible by rinsing with water to remove all traces of dust, abrasives, etc. which may have accumulated during construction. Then, using either a spray or a saturated cloth, apply a cleaning solution (a mild detergent and water solution is recommended) to the coated surface. Gently rub the wetted coated surface with a clean, lint-free towel or cloth. Rinse with water* and wipe nearly dry with a dry, clean, lint-free towel or cloth. Any moisture remaining on the surface will evaporate to leave a clean surface.

The use of a squeegee on the coated surface is not recommended. If it is absolutely necessary to use a squeegee then particular care must be taken to prevent any metal parts from contacting the coating or dirt particles becoming trapped under the blade and dragged across the coating.

**If the water quality is very hard (i.e. greater than 180ppm combined content of calcium carbonate, $CaCO_3$ and magnesium carbonate, $MgCO_3$) then rinsing water should be softened with a domestic water softener or through the addition of a couple of drops of detergent (dishwashing detergent will suffice) to a litre of water.*

The information contained in this document provides general guidance as to best practice with regard to the handling, processing and glazing of Pilkington **Activ**™. *It does not, however, constitute any representation or warranty with respect to the product, its performance or its suitability for any application.* **Pilkington plc** *hereby disclaim all liability howsoever arising from any error on or omission from this publication and for all consequences of relying on it.*

Pilkington **Activ**™
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